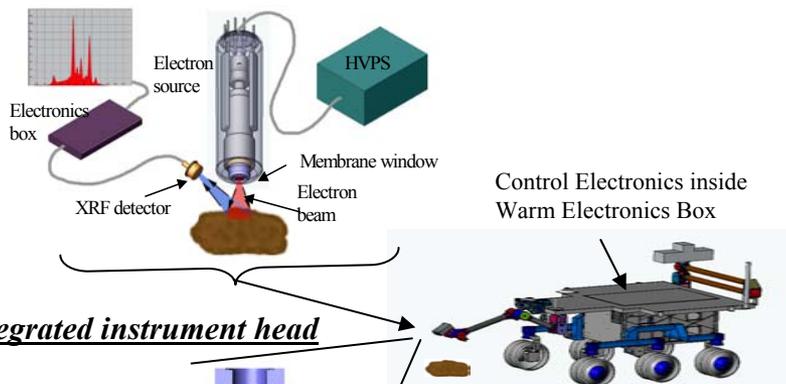




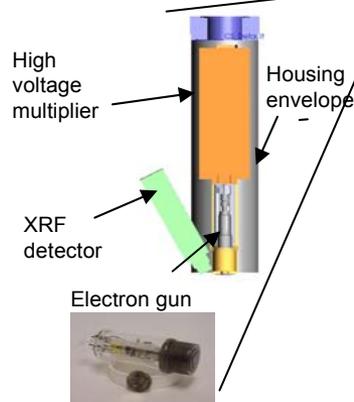
ATMOSPHERIC ELECTRON X-RAY SPECTROMETER (AEXS) FOR IN-SITU ELEMENTAL ANALYSIS



Instrument concept



Integrated instrument head



AEXS: A miniature electron-source based XRF instrument for *in situ* elemental analysis of samples in planetary atmosphere

- No sample preparation is necessary
- Rapid spectrum acquisition (<1 min/XRF spectrum), resulting in low energy consumption per spectrum
- Medium and variable (cm- to sub mm) spatial resolution
 - Large area could be scanned quickly, followed by spot focusing
 - Resolved composition may be indicative of mineralogy
- Detection limited by Amptek detector window thickness to elements heavier than Na (could be extended to lighter elements using thinner window)

Status:

- Ph 1 Construct a “stand-alone” electron source (FY 05)
- ➔ -Ph 2 Assemble the AEXS instrument head (Mid FY 07)
- Ph 3 Accommodation on a mobile platform

Significant Results:

- The measured elemental abundance was in good agreement (within 4%) with the certified composition for mineral standards in up to 90 Torr-cm thick atmosphere
- Features were resolved with ~ 1 mm spatial resolution

MIDP'03: AEXS Development

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